SIEMENS

LITHOSTAR MODULARIS

SP

Maintenance Instructions

System

LITHOSTAR MODULARIS / Vario

The protocol SPL1-130.832.02.01.02 is required for these instructions

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Table of Contents

1 General Information 4

Required Documents 4
Measurement Devices and Auxiliary Materials 4
Emphasized text 5
Safety information and protective measures 6
Tolerance data for linear dimensions 7
Tolerance data for torque values 8
Explanation of abbreviations in the maintenance certificate 9
Maintenance interval 10

2 LITHOSTAR MODULARIS / Vario Maintenance 11

Visual inspection of exterior 11
Inspection of environment 12
System checks 13
Preventive maintenance 14
Water system 15
Functional check 16
Operating values 17
Final Work Steps 18

3 Changes to Previous Version 19

1 General Information

1.1 Required Documents

• Spare Parts List	Spare Parts Catalog
• Service protocol	SPL1-130.832.02
• Service instructions	SPL1-130.832.02
• Service instructions for "Pressure test and position control"	SPL2-120.074.01
• Operating instructions	

1.1.1 Measurement Devices and Auxiliary Materials

NOTE

The articles mentioned are listed in the STC (Service Tools Catalog) unless otherwise stated (the STC is part of the Spare Parts Catalog).

• Protective conductor meter		44 15 899 RV 090
• Digital voltmeter, e.g., Fluke 187		99 94 831
• Pressure test device		30 95 408 J1008
• PTU adapter		98 17 347
• Service PC acc. to ARTD		
• Service PC connection cable		99 00 440 RE999
• ESD kits, AR TD 3	- Wrist band	34 63 874
	- Cable	34 64 062
• Start-up tool kit		
• "Longtime PD2" grease 1 kg		73 95 445 RH999

1.2 Emphasized text

⚠DANGER	**DANGER indicates when there is an immediate danger that l e a d s to death or serious physical injury.**
⚠WARNING	**WARNING indicates a risk of danger that m a y l e a d to death or serious physical injury.**
⚠ CAUTION	**CAUTION used with the safety alert symbol indicates a risk of danger that leads to slight or moderate physical injury and/ or damage to property.**
NOTICE	**NOTICE used without the safety alert symbol indicates a risk of danger that if disregarded leads or may lead to a potential situation which may result in an undesirable result or state other than death, physical injury or property damage.**

Fig. 1: Safety Notes

1.3 Safety information and protective measures

- Adhere to the protective measures described in register 1 of the system binder.
- When performing the work steps, the product-specific safety information contained in the document as well as the general safety information in ARTD, Part 2 must be observed.
- Observe ESD regulations!

⚠WARNING

Dangerous X-ray radiation and/or dangerous electrical voltage during test and adjustment operations!

Disregarding safety precautions can result in death or serious bodily injury.

The following points must be observed:

- ➪ **Disconnect the power cable when working on the system.**
- ➪ **Ensure compliance with the general safety requirements when working with the system under power.**
- ➪ **Switch off the power prior to replacing modules or boards.**
- ➪ **After completing all service work and reattaching the covers, perform the protective conductor test according to ARTD-002.731.17.**
- ➪ **The protective conductor resistance may not exceed 0.2 Ohms.**
- ➪ **When performing service work on the power-on module, (replacing the power-on module or replacing the power cable), the equivalent leakage current must be measured and recorded.**
- ➪ **Checks and settings that need to be performed under X-ray radiation are identified by the radiation warning symbol ⚠ . Suitable radiation protection measures must be adopted during these types of adjustment. (Refer to ARTD, Part 2)**

1.4 Tolerance data for linear dimensions

General tolerances for linear dimensions per ISO 2768

These tolerances apply to all dimensions indicated in these instructions, unless other tolerances are specifically indicated after the value.

Limit value for the nominal range	Allowable tolerance
over 3 mm to 6 mm	± 0.5 mm
over 6 mm to 30 mm	± 1.0 mm
over 30 mm to 120 mm	± 1.5 mm
over 120 mm to 400 mm	± 2.5 mm
over 400 mm to 1,000 mm	± 4.0 mm
over 1,000 mm to 2,000 mm	± 6.0 mm
over 2,000 mm to 4,000 mm	± 8.0 mm

1.5 Tolerance data for torque values

If no other information is provided, use the corresponding torque values for hardness rating 8.8 when checking torque values.

A tolerance of ± 10% is permitted for torque values.

1.6 Explanation of abbreviations in the maintenance certificate

Abbrev.	Description
SI	Safety Inspection
SIE	Electrical Safety
SIM	Mechanical Safety
PM	Preventive Maintenance
PMP	Periodic Preventive Maintenance
PMA	Preventive Maintenance Adjustments
PMF	Preventive Check of Operating Values/Functions
Q	System Quality, Image Quality
QIQ	Image Quality
QSQ	System Quality Check
SW	Software Maintenance
CSE	Customer Service Engineer
KSK No.	Customer-specific code
IVK	Installed Volume Component
GR	Maintenance Unit

The steps identified by these abbreviations are part of the maintenance certificate and should be checked off upon completion.

1.7 Maintenance interval

Unless otherwise indicated, the maintenance interval is 12 months.

NOTE

The sequence for complete maintenance and inspection is described on the following pages.

Each work step must be performed on an annual basis, if not otherwise specified.

2 LITHOSTAR MODULARIS / Vario Maintenance

2.1 Visual inspection of exterior

PMP Cover panels

- Check the system cover panels for damage.

2.2 Inspection of environment

SIE **Power outlets**

- Check the power plug for damage.

SIE **Line voltage**

- Check line voltage.

SIE **Ground fault detector**

- Check ground fault detector.

2.3 System checks

SIM Cover panels

- Remove the cover panels.
- Check cover panels for damage.

SIM Suspension arm

- Move the support arm sequentially into all positions (docking, working and transport positions) and check that the arm locks into position correctly; there should be no play when the support arm is in the working position.
- Position the support arm vertically and check that it locks correctly into position.
- Move the coupling motor into the working position and check that it locks correctly into position. (does not apply to Vario).
- Check the support arm mounting.

SIM Brakes

- On a level floor, check the function of the footbrake.

SIM Wheels

- On a level surface, check that the system carriage moves evenly and quietly.
- Check all cable deflectors.

SIM Warning labels and markings

- Check the status of warning labels and markings.
  - ➪ Replace any illegible labels or markings.

SIE Cable and plugs

- Check accessible cables and plugs for damage.

SIE Isocenter crosshairs on the I.I. of the ARCADIS Orbic or SIREMOBIL Iso-C, or C-arm unit of the Vario

- Check the isocenter crosshairs for firm seating.

2.4 Preventive maintenance

PMP System

- Clean visible cables.
- Clean out surfaces of covers.
- Clean tires on wheels.
- Clean interior of system cart.

PMP Guide pins for additional deflection rollers

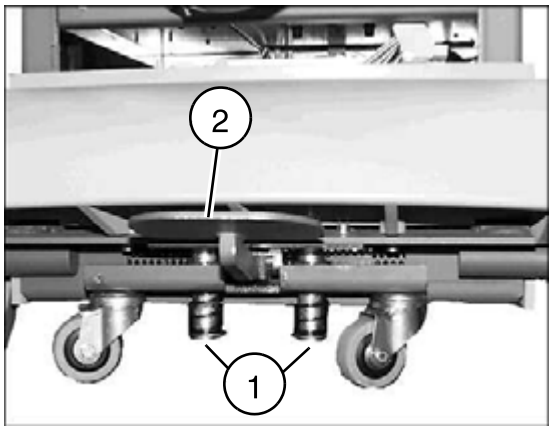

Fig. 1:

- Apply grease to guide pins.(1/Fig. 1 / p. 14).
- Operate pedal (2/Fig. 1 / p. 14). The pedal must respond easily.

PMP Suspension arm

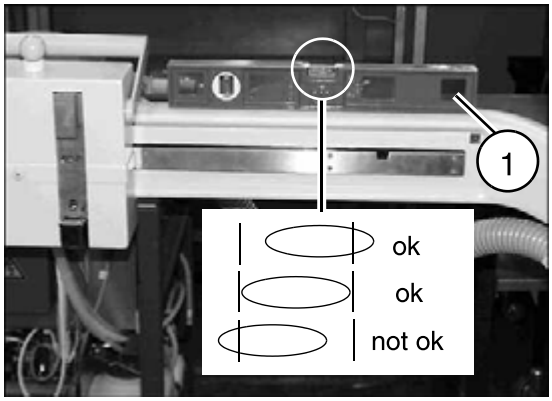

Fig. 2:

- Position the support arm vertically and in the docking position (center locking position).
- Set a spirit level on the support arm (1/Fig. 2 / p. 14).
- The air bubble may move to the right, but may not tilt to the **left** (Fig. 2 / p. 14).
  - If the air bubble moves to the left, the spring must be replaced (see LITHOSTAR MODULARIS Service Instructions).

PMP Ventilation

- Remove any dust or dirt from the ventilation slots of the charging unit.
- Clean vents of cooling system.

- Clean system ventilation.

PMP Batteries (every 5 years)

- Replace the batteries every 5 years. Transfer all device information to a diskette prior to replacing (refer to Service Instructions SPL1-130.840.02).

2.4.1 Water system

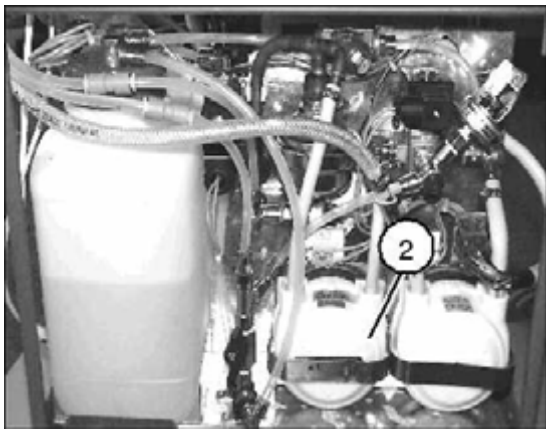

Fig. 3:

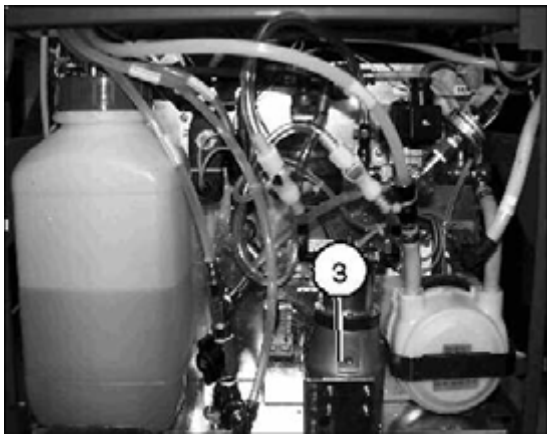

Fig. 4:

PMP Water filter

- Drain the cooling circuit (refer to Service Instructions SPL1-130.840.01).
- Clean the water filter from the cooling system.

PMP Cooling circuit

- Drain the cooling circuit (refer to Service Instructions SPL1-130.840.01).
- If the pump head (2/Fig. 3 / p. 15) is still installed, replace it with the cooling pump (3/Fig. 4 / p. 15). (does not apply to Vario).

PMP Water circuitry system controlling coupling - pump head

- Drain the coupling circuit (refer to Service Instructions SPL1-130.840.01).
- Replace pump head on an annual basis.

PMP Refilling water system

- Fill the water system with new water (refer to Service Instructions SPL1-130.840.02).

2.5 Functional check

- Couple the LITHOSTAR MODULARIS to the ARCADIS Orbic or SIREMOBIL Iso-C (refer to Operating Instructions). Connect the cables to the ARCADIS Orbic/SIREMOBIL Iso-C and the MODULARIS Uro.
- Check the blocking functions on the ARCADIS Orbic/SIREMOBIL Iso-C.

PMP Operator panel

- Check all the operating functions.

PMF Isocenter with X-ray

- Fold up the isocenter phantom on the shock wave head.
- Check mechanical stability of the isocenter phantom and look for any water leaks.

- Inspect the isocenter according to the Operating Instructions (for required adjustments, refer to Service Instructions SPL1-130.840.02).
- Fold down the isocenter phantom on the shock wave head.

PMF Isocenter ultrasound localization

- Fold up isocenter phantom on the shock wave head.
- Check mechanical stability of the isocenter phantom and look for any water leaks.
- Inspect the isocenter according to the Operating Instructions (for required adjustments, refer to Service Instructions SPL1-130.840.02).
- Fold down the isocenter phantom on the shock wave head.

PMF Triggering shock waves

- Release shock waves at each energy level.

PMF Pressure measurement

- Perform pressure measurement according to instructions SPL2-120.074.01.

PMP Maintenance

- Touch up damaged paint.

2.6 Operating values

- Transfer all device information to a diskette (number of shock waves, error log, etc).
- If the counter for shock wave head C has almost reached the value of "950,000", the shock wave head must be replaced, and if the value "2 million" has been reached, the charger with discharger must be replaced.
- If the counter for shock wave head C plus has almost reached the value of "2 million", the shock wave head C plus must be replaced.

  The charger with semiconductor switch is not affected by wear and need not be replaced as a preventive measure.

2.7 Final Work Steps

- Re-attach the system covers.

SIE Protective Conductor Test

- Perform the protective conductor test with the system closed (ARTD- 002.731.17.).
  - ➪ The protective conductor resistance may not exceed 0.2 Ohms.

3 Changes to Previous Version

Chapter:	"General Information"	Under "Required Documents" Service protocol variants changed.
Chapter:	"LITHOSTAR MODULARIS Maintenance"	• Explains the term "Vario." • Explains the term "ARCADIS Orbic" before "SIREMOBIL Iso-C". • Under the section "Functional Check": "Oil leak" replaced by the term "water leak." • Under the section "Operating Values": the second sub-item changed and a second sub-item expanded.